CLAIMS

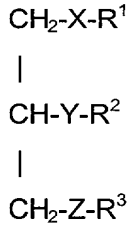
1. A lipid-based drug delivery system for administration of an active drug substance selected from lysolipid derivatives, wherein the active drug substance is present in the lipid-based system in the form of a prodrug, said prodrug being a lipid derivative having (a) an aliphatic group of a length of at least 7 carbon atoms and an organic radical having at least 7 carbon atoms, and (b) a hydrophilic moiety, said prodrug furthermore being a substrate for extracellular phospholipase A2 to the extent that the organic radical can be hydrolytically cleaved off, whereas the aliphatic group remains substantially unaffected, whereby the active drug substance is liberated in the form of a lysolipid derivative which is not a substrate for lysophospholipase, said system having included therein lipopolymers or glycolipids so as to present hydrophilic chains on the surface of the system.

2. A drug delivery system according to claim 1, wherein the lipopolymers or glycolipids are represented by at least a fraction of the prodrug.

3. A drug delivery system according to claim 1, wherein the polymer of the lipopolymer is selected from polyethylene glycol, poly(lactic acid), poly(glycolic acid), poly(lactic acid)-poly(glycolic acid) copolymers, polyvinyl alcohol, polyvinylpyrrolidone, polymethoxazoline, polyethyloxazoline, polyhydroxypropyl methacrylamide, polymethacrylamide, polydimethylacrylamide, and derivatised celluloses.

4. A drug delivery system according to claim 1, wherein the organic radical which can be hydrolytically cleaved off, is an auxiliary drug substance or an efficiency modifier for the active drug substance.

5. A drug delivery system according to claim 1, wherein the prodrug is a lipid derivative of the following formula:



wherein

X and Z independently are selected from O, CH_2, NH, NMe, S, S(O), and $S(O)_2$;

Y is -OC(O)-, Y then being connected to R^2 via either the oxygen or carbonyl carbon atom;

R^1 is an aliphatic group of the formula Y^1Y^2;

R^2 is an organic radical having at least 7 carbon atoms;

where Y^1 is $-(CH_2)_{n1}-(CH=CH)_{n2}-(CH_2)_{n3}-(CH=CH)_{n4}-(CH_2)_{n5}-(CH=CH)_{n6}-(CH_2)_{n7}-(CH=CH)_{n8r}-(CH_2)_{n9}$, and the sum of n1+2n2+n3+2n4+n5+2n6+n7+2n8+n9 is an integer of from 9 to 29; n1 is zero or an integer of from 1 to 29, n3 is zero or an integer of from 1 to 20, n5 is zero or an integer of from 1 to 17, n7 is zero or an integer of from 1 to 14, and n9 is zero or an integer of from 1 to 11; and each of n2, n4, n6 and n8 is independently zero or 1; and Y^2 is CH_3 or CO_2H; where each Y^1-Y^2 independently may be substituted with halogen or C_{1-4}-alkyl,

R^3 is selected from phosphatidic acid (PO_2-OH), derivatives of phosphatidic acid and bioisosters to phosphatic acid and derivatives thereof.

6. A drug delivery system according to claim 5, wherein R^2 is an aliphatic group of a length of at least 7 carbon atoms.

7. A drug delivery system according to claim 6, wherein R^2 is a group of the formula Y^1Y^2.

8. A drug delivery system according to claim 1, wherein at least a fraction of the prodrug is of the formula defined in claim 5, wherein R^3 is a derivative of phosphatidic acid to which a polymer selected from polyethylene glycol, poly(lactic acid), poly(glycolic acid), poly(lactic acid)-poly(glycolic acid) copolymers, polyvinyl alcohol, polyvinylpyrrolidone, polymethoxazoline, polyethyloxazoline, polyhydroxypropyl methacrylamide, polymethacrylamide, polydimethylacrylamide, and derivatised celluloses, is covalently attached.

9. A drug delivery system according to claim 1, wherein the prodrug constitutes 15-100 mol% of the total dehydrated lipid-based system.

10. A drug delivery system according to claim 1, wherein the lipopolymer constitutes 1-50 mol% of the total dehydrated system.

11. A drug delivery system according to claim 1, wherein the lipid-based system is in the form of liposomes .

12. A drug delivery system according to claim 1, which is in the form of liposomes wherein a second drug substance is incorporated.

13. A drug delivery system according to claim 12, wherein the second drug substance is a therapeutically and/or prophylactically active substanceselected from (i) antitumor agents , (ii) antibiotics and antifungals, and (iii) antiinflammatory agents .

14. A pharmaceutical composition comprising the lipid-based drug delivery system according to claim 1 and optionally a pharmaceutically acceptable carrier.

15. A method for selectively drug targeting to neoplastic cells, e.g., to areas within the mammalian body, preferably a human, having a extracellular phospholipase A2 activity which is at least 25% higher compared to the normal activity in said areas, by administering to the mammal in need thereof an efficient amount of the drug delivery system defined in claim 1.

16. A method of treating a mammal, preferably a human, by administering to the mammal in need thereof an efficient amount of the drug delivery system defined in claim 1.

17. The method according to claim 16 for the treatment of diseases or conditions associated with a localised increase in extracellular phospholipase A2 activity in mammalian tissue.

18. The method according to claim 17, wherein the diseases or conditions are selected from the group consisting of inflammatory conditions and cancer.

19. The method according to claim 18, wherein the type of cancer is selected from the group consisting of brain cancer, breast cancer, lung cancer, colon cancer, ovarian cancer, leukemia, lymphoma, sarcoma and carcinoma.

20. The method according to claim 15, wherein the increase in extracellular phospholipase A2 activity is a least 25% compared to the normal level of activity in the tissue in question.

21. A method according to claim 20, wherein the drug delivery system becomes located in diseased tissue after administration and, after degradation by extracellular phospholipase A2, leads to an increase in membrane permeability of cells in the diseased tissue.

22. A method according to claim 20, wherein the drug delivery system includes a second drug substance, a membrane component, and/or an auxiliary drug substance which acts as an proactivator for extracellular phospholipase A2.

23. A method according to claim 20, wherein the drug delivery system becomes located in a diseased tissue after administration, and wherein degradation of the drug delivery system by extracellular phospholipase A2 in the diseased tissue is accelerated by a localised increase in temperature in said tissue.

24. The method according to claim 15 for the treatment of diseases or conditions selected from the group consisting of inflammatory conditions and cancer.

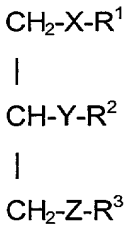
25. A lipid based drug delivery system for administration of an second drug substance, wherein the second drug substance is incorporated in the system, said system including lipid derivatives which has (a) an aliphatic group of a length of at least 7 carbon atoms and an organic radical having at least 7 carbon atoms, and (b) a hydrophilic moiety, where the lipid derivative furthermore is a substrate for extracellular phospholipase A2 to the extent that the organic radical can be hydrolytically cleaved off, whereas the aliphatic group remains substantially unaffected, so as to result in an organic acid fragment or an organic alcohol fragment and a lysolipid fragment, said lysolipid fragment not being a substrate for lysophospholipase, said system having included therein lipopolymers or glycolipids so as to present hydrophilic chains on the surface of the system.

26. A drug delivery system according to claim 25, wherein the lipopolymers or glycolipids are represented by at least a fraction of the prodrug.

27. A drug delivery system according to claim 25, wherein the polymer of the lipopolymer is selected from polyethylene glycol, poly(lactic acid), poly(glycolic acid), poly(lactic acid)-poly(glycolic acid) copolymers, polyvinyl alcohol, polyvinylpyrrolidone, polymethoxazoline, polyethyloxazoline, polyhydroxypropyl methacrylamide, polymethacrylamide, polydimethylacrylamide, and derivatised celluloses.

28. A drug delivery system according to claim 25, wherein the organic radical which can be hydrolytically cleaved off, is an auxiliary drug substance or an efficiency modifier for the second drug substance.

29. A drug delivery system according to claim 25, wherein the lipid derivative isa lipid derivative of the following formula:



wherein

X and Z independently are selected from O, CH_2, NH, NMe, S, S(O), and $S(O)_2$;

Y is -OC(O)-, Y then being connected to R^2 via either the oxygen or carbonyl carbon atom;

R^1 is an aliphatic group of the formula Y^1Y^2;

R^2 is an organic radical having at least 7 carbon atoms;

where Y^1 is $-(CH_2)_{n1}-(CH=CH)_{n2}-(CH_2)_{n3}-(CH=CH)_{n4}-(CH_2)_{n5}-(CH=CH)_{n6}-(CH_2)_{n7}-(CH=CH)_{n8r}-(CH_2)_{n9}$, and the sum of n1+2n2+n3+2n4+n5+2n6+n7+2n8+n9 is an integer of from 9 to 29; n1 is zero or an integer of from 1 to 29, n3 is zero or an integer of from 1 to

20, n5 is zero or an integer of from 1 to 17, n7 is zero or an integer of from 1 to 14, and n9 is zero or an integer of from 1 to 11; and each of n2, n4, n6 and n8 is independently zero or 1; and Y^2 is CH_3 or CO_2H; where each Y^1-Y^2 independently may be substituted with halogen or C_{1-4}-alkyl,

R^3 is selected from phosphatidic acid (PO_2-OH), derivatives of phosphatidic acid and bioisosters to phosphatic acid and derivatives thereof.

30. A drug delivery system according to claim 29, wherein R^2 is an aliphatic group of a length of at least 7 carbon atoms.

31. A drug delivery system according to claim 30, wherein R^2 is a group of the formula Y^1Y^2.

32. A drug delivery system according to claim 25, wherein at least a fraction of the prodrug is of the formula defined in claim 29, wherein R^3 is a derivative of phosphatidic acid to which a polymer selected from polyethylene glycol, poly(lactic acid), poly(glycolic acid), poly(lactic acid)-poly(glycolic acid) copolymers, polyvinyl alcohol, polyvinylpyrrolidone, polymethoxazoline, polyethyloxazoline, polyhydroxypropyl methacrylamide, polymethacrylamide, polydimethylacrylamide, and derivatised celluloses, is covalently attached.

33. A drug delivery system according to claim 25, wherein the lipid derivative constitutes 15-100 mol% of the total dehydrated system.

34. A drug delivery system according to claim 25, wherein the lipopolymer constitutes 1-50 mol% of the total dehydrated system.

35. A drug delivery system according to claim 25, wherein the system is in the form of liposomes.

36. A drug delivery system according to claim 25, wherein the second drug substance is a therapeutically and/or prophylactically active substance selected from (i) antitumor agents, (ii) antibiotics and antifungals, and (iii) antiinflammatory agents.

37. A pharmaceutical composition comprising the drug delivery system according to claim 25 and optionally a pharmaceutically acceptable carrier.

38. A method for selectively drug targeting to neoplastic cells, e.g., to areas within the mammalian body, preferably a human, having a extracellular phospholipase A2 activity which is at least 25% higher compared to the normal activity in said areas, by administering to the mammal in need thereof an efficient amount of the drug delivery system defined in claim 25.

39. A method of treating a mammal, preferably a human, by administering to the mammal in need thereof an efficient amount of the drug delivery system defined in claim 25.

40. The method according to claim 39 for the treatment of diseases or conditions associated with a localised increase in extracellular phospholipase A2 activity in mammalian tissue.

41. The method according to claim 40, wherein the diseases or conditions are selected from the group consisting of inflammatory conditions and cancer.

42. The method according to claim 41, wherein the type of cancer is selected from the group consisting of brain cancer, breast cancer, lung cancer, colon cancer, ovarian cancer, leukemia, lymphoma, sarcoma and carcinoma.

43. The method according to claim 38, wherein the increase in extracellular phospholipase A2 activity is a least 25% compared to the normal level of activity in the tissue in question.

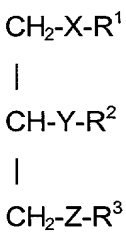
44. A method according to claim 43, wherein the drug delivery system becomes located in diseased tissue after administration and, after degradation by extracellular phospholipase A2, leads to an increase in membrane permeability of cells in the diseased tissue.

45. A method according to claim 43, wherein the drug delivery system includes a second drug substance, a membrane component, and/or an auxiliary drug substance which acts as an proactivator for extracellular phospholipase A2.

46. A method according to claim 43, wherein the drug delivery system becomes located in a diseased tissue after administration, and wherein degradation of the drug delivery system by extracellular phospholipase A2 in the diseased tissue is accelerated by a localised increase in temperature in said tissue.

47. The method according to claim 38, wherein the diseases or conditions are selected from the group consisting of inflammatory conditions and cancer.

48. A lipid derivative of the following formula:



wherein
X and Z independently are selected from O, CH_2, NH, NMe, S, S(O), and $S(O)_2$;

Y is -OC(O)-, Y then being connected to R^2 via either the oxygen or carbonyl carbon atom;

R^1 is an aliphatic group of the formula Y^1Y^2;

R^2 is an organic radical having at least 7 carbon atoms;

where Y^1 is $-(CH_2)_{n1}-(CH=CH)_{n2}-(CH_2)_{n3}-(CH=CH)_{n4}-(CH_2)_{n5}-(CH=CH)_{n6}-(CH_2)_{n7}-(CH=CH)_{n8r}-(CH_2)_{n9}$, and the sum of n1+2n2+n3+2n4+n5+2n6+n7+2n8+n9 is an integer of from 9 to 29; n1 is zero or an integer of from 1 to 29, n3 is zero or an integer of from 1 to 20, n5 is zero or an integer of from 1 to 17, n7 is zero or an integer of from 1 to 14, and n9 is zero or an integer of from 1 to 11; and each of n2, n4, n6 and n8 is independently zero or 1; and Y^2 is CH_3 or CO_2H; where each Y^1-Y^2 independently may be substituted with halogen or C_{1-4}-alkyl,

R^3 is selected from derivatives of phosphatidic acid to which a hydrophilic polymer is attached.

49. A lipid derivative according to claim 48, wherein the hydrophilic polymer is selected from polyethylene glycol, poly(lactic acid), poly(glycolic acid), poly(lactic acid)-poly(glycolic acid) copolymers, polyvinyl alcohol, polyvinylpyrrolidone, polymethoxazoline, polyethyloxazoline, polyhydroxypropyl methacrylamide, polymethacrylamide, polydimethylacrylamide, and derivatised celluloses.

50. A lipid derivative according to claim 48, wherein X and Z are O.

51. A lipid derivative according to claim 48, wherein X and Z are O, R^1 and R^2 are independently selected from alkyl groups, $(CH_2)_nCH_3$, where n is 11, 12, 13, 14,15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, or 29; Y is -OC(O)-, Y then being connected to R^2 via the carbonyl carbon atom.

52. A pharmaceutical composition comprising the lipid derivative according to claim 48 and optionally a pharmaceutically acceptable carrier.

53. A pharmaceutical composition according to claim 52, wherein the lipid derivative is dispersed in the form of a liposome or a micelle.

54. A method of treating a mammal, preferably a human, by administering to the mammal in need thereof an efficient amount of the lipid derivative defined in claim 48.

55. The use according to claim 54, wherein the diseases or conditions are selected from the group consisting of inflammatory conditions, and cancer.

56. The use according to claim 55, wherein the type of cancer is selected from the group consisting of brain cancer, breast cancer, lung cancer, colon cancer, ovarian cancer, leukemia, lymphoma, sarcoma and carcinoma.